

The surveillance programme for *Gyrodactylus salaris* in Atlantic salmon and rainbow trout in Norway 2016



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Summary

In 2016, *Gyrodactylus salaris* was not detected in any of the rivers or fish farms included in the surveillance program.

Introduction

During the period of 1975 to 2016, pathogenic strains of *Gyrodactylus salaris* have been detected on Atlantic salmon (*Salmo salar*) fingerlings/parr in 50 rivers, 13 hatcheries/farms with Atlantic salmon parr/smolt and 26 hatcheries/farms with rainbow trout (*Oncorhynchus mykiss*). The latest detection was in 2015, in River Kitdalselva, in Troms County, where infected fish were found during a rotenone treatment. In addition, both pathogenic and non-pathogenic strains of *G. salaris* have been found on Arctic charr (*Salvelinus alpinus*).

The policy of the Norwegian Authorities is to eradicate *G. salaris* from infected watersheds and farms (Anon 2014). In farms, the eradication procedure is carried out by eliminating the hosts (salmon and rainbow trout). This ensures elimination of the parasite because it lacks specialized free-living stages and does not use intermediate hosts in its life-cycle. In rivers, the eradication measures are carried out by rotenone treatment. One exception is the treatment of River Lærdalsevla in 2011-2012, where acidified aluminum sulphate was used with promising results.

By December 31st 2016, *G. salaris* was confirmed eradicated from 22 rivers and from all hatcheries/fish farms. In 18 additional rivers, eradication measures have been completed, but eradication has not yet been confirmed. In three rivers, rotenone treatment was carried out in 2016, and the measures will be completed in 2017. Thus, at the end of 2016, the parasite is confirmed present in 7 Norwegian rivers.

G. salaris is a notifiable (List 3) disease in Norway and it is listed as "Other significant disease" by the World Organisation for Animal Health (OIE). Surveillance of *G. salaris*, aiming to declare freedom from the parasite in treated rivers, has been ongoing since early 1980s. The Norwegian Veterinary Institute (NVI) coordinates the surveillance programme and publishes the overall results in monthly and annual reports available on the NVI website (www.vetinst.no).

The Norwegian Food Safety Authority is responsible for the sampling in fish farms. NVI is responsible for the sampling in the rivers, but County Environmental Departments and other institutions/companies are commissioned to do the actual sampling. NVI is responsible for examination of all the fish samples and the species identification of the parasites if *Gyrodactylus* is detected.

Aims

The surveillance programme aims to document the freedom of *G. salaris* in Norwegian farms and rivers, and to detect and trace any spread of the parasite to new river systems or fish farms (or to rivers and farms declared free from infection).

Materials and methods

The selection of rivers for inclusion in the surveillance programme is based on the risk of being infected with *G. salaris*. A total of 30 wild Atlantic salmon are sampled from each river, preferably from 3 different sites located far apart. In Tana, 150 salmon are sampled at 15 sites due to the large size of this watercourse. Fingerlings/parr/smolt are caught by means of electrofishing. The fish are killed and then preserved whole in 96 % ethanol.

In farms and hatcheries, either 30 Atlantic salmon or 60 rainbow trout are sampled by seine net in each farm. The fish are killed, and all fins (except adipose fin) are cut off and preserved in 96 % ethanol.

All the samples are sent to the NVI in Harstad where the samples are examined under a stereo microscope at 10 - 15 times magnification. For wild Atlantic salmon, the whole fish surface including the body, head and fins are examined, while fins only are examined for farmed fish.

When *Gyrodactylus* specimens are found, they are sent to the Norwegian Veterinary Institute in Oslo, the OIE reference laboratory for the disease, for species determination. The methods used for species identification follows those in the Gyrodactylosis (*G. salaris*) chapter in the Manual of diagnostic tests for aquatic animals from the World Organisation for Animal Health (OIE) (http://www.oie.int/index.php?id=2439&L=0&htmfile=chapitre_gyrodactylus_salaris.htm).

Results and Discussion

Altogether, 2263 specimens from 69 rivers and 2622 specimens from 79 farms were examined in 2016 (Table 1).

Table 1. Number of rivers, farms and fish examined for *Gyrodactylus salaris* in 2016.

County	Rivers				Farms			
	No.	Fish*	No. of fish examined	Positive	No.	Fish*	No. of fish examined	Positive
Finnmark	9	AS	405	0	2	AS	60	0
Troms	4	AS	126	0	6	AS	181	0
Nordland	9	AS	277	0	16	AS	483	0
Nord-Trøndelag	6	AS	199	0	8	AS	240	0
Sør-Trøndelag	4	AS	121	0	2	AS	64	0
Møre og Romsdal	16	AS	492	0	6	AS	183	0
Sogn og Fjordane	4	AS	93	0	8	AS/RT	281	0
Hordaland	1	AS	30	0	19	AS/RT	704	0
Rogaland	3	AS	90	0	8	AS	245	0
Vest-Agder	4	AS	143	0	1	AS	30	0
Aust-Agder	0	-	-	-	0	-	-	-
Telemark	0	-	-	-	1	AS	30	0
Vestfold	3	AS	108	0	0	-	-	-
Buskerud	1	AS	34	0	0	-	-	-
Oppland	0	-	-	-	2	RT	121	0
Oslo	0	-	-	-	0	-	-	-
Akershus	3	AS	97	0	0	-	-	-
Østfold	2	AS	48	0	0	-	-	-
Total	69		2 263	0	79		2 622	0

* AS = Atlantic salmon, RT = rainbow trout.

In 2016, *G. salaris* was not detected in any of the rivers or fish farms included in the surveillance program.

References

1. Anon (2014). Handlingsplan mot lakseparasitten *Gyrodactylus salaris* for perioden 2014-2016. Miljødirektoratet 2014. 114 s.

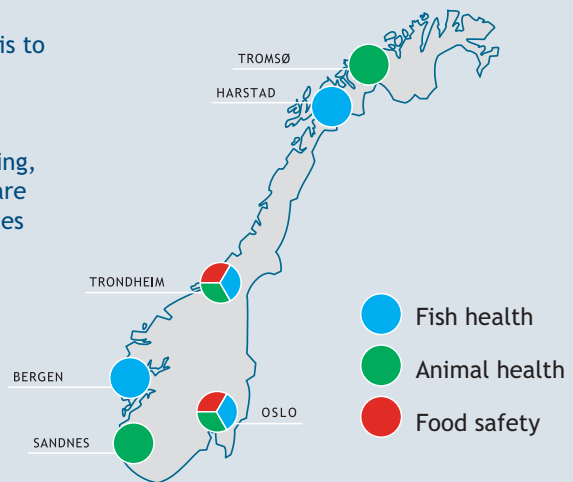
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